

What is claimed is:

- 5 1. An endoscopic surgical clip applier, comprising:
a shaft assembly having a distal end adapted for insertion through a cannula
into a body cavity;
a clip channel disposed within the shaft assembly for retaining a plurality of
clips;
a jaw assembly extending from the distal end of the shaft assembly and
comprising:
10 a first jaw member having a first jaw arm for engaging a first portion
of a ligating clip and an opposing second jaw arm for engaging a second portion of a
ligating clip, the first and second jaw arms each comprising a cam surface,
and a second jaw member having a third jaw arm for engaging a third
portion of a ligating clip and an opposing fourth jaw arm for engaging a fourth
15 portion of a ligating clip, the third and fourth jaw arms each comprising a cam
surface; and
an actuation assembly for advancing a clip from the clip channel to the jaw
assembly and closing the jaw assembly.
- 20 2. The clip applier of claim 1, wherein the shaft assembly includes:
an outer shaft member having a longitudinal axis extending along its length;
a clip channel disposed within the shaft member and moveable relative to the
outer shaft along the longitudinal axis.
- 25 3. The clip applier of claim 2, wherein:
the first jaw member comprises a substantially U-shaped body segment
having a first leg and a second leg connected by a bridge member, wherein the first
jaw arm extends from the first leg and the second jaw arm extends from the second

leg; and

the second jaw member comprises a substantially U-shaped body segment having a third leg and a fourth leg connected by a bridge member, wherein the third jaw arm extends from the third leg and the fourth jaw arm extends from the fourth leg.

4. The clip applier of claim 3, wherein:

the bridge member of the first jaw member is connected to a first side of the clip channel; and

the bridge member of the second jaw member is connected to a second side of the clip channel, opposite the first side.

5. The clip applier of claim 3, wherein:

the bridge member of the first jaw member is pivotally connected to a first side of the clip channel; and

the bridge member of the second jaw member is pivotally connected to a second side of the clip channel, opposite the first side.

6. The clip applier of claim 5, wherein:

the outer shaft assembly includes cam surfaces adapted to cooperate with corresponding cam surfaces on the first jaw member and the second jaw member.

7. The clip applier of claim 6, wherein:

the actuation assembly induces relative motion between the outer shaft and the clip channel, such that the cam surfaces on the outer shaft impinge upon the cams of the first jaw member and the second jaw member to close the jaw assembly.

8. The clip applier of claim 7, wherein the actuation assembly moves the clip

channel relative to a fixed outer shaft.

9. The clip applier of claim 7, wherein the actuation assembly moves the outer shaft relative to a fixed clip channel.

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10. The clip applier of claim 1, further comprising a clip feeding assembly for feeding clips from the clip channel to the jaw assembly.

11. The clip applier of claim 1, further comprising:

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a feeder bar slideably moveable along a length of the clip channel, the feeder bar having a plurality of clip advancing elements for advancing clips toward the distal end of the clip channel.

12. The clip applier of claim 11, wherein the feeder bar is moveable between a proximal position, in which the clip feeding mechanism retrieves a clip from the clip channel, and a distal position, in which the feeder bar delivers a clip to the jaw assembly.

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13. The clip applier of claim 11, wherein the feeder bar includes a foot member for rotating the most distal clip in the clip cartridge when the feeder bar moves in a proximal direction.

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14. An endoscopic surgical clip applier, comprising:

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an exterior shaft assembly having a proximal end and a distal end adapted for insertion through a cannula into a body cavity and having a plurality of cam surfaces formed at the distal end;

a jaw assembly extending from the distal end of the shaft assembly and including a first jaw member having a first jaw arm for engaging a first portion of a

ligating clip and an opposing second jaw arm for engaging a second portion of a ligating clip, the first and second jaw arms each comprising a cam surface;

a clip channel disposed within the exterior shaft assembly and adapted to hold a plurality of clips;

5 a feeder bar for feeding clips from the clip channel to the jaw assembly; and
an actuation assembly for closing the jaw assembly, wherein the actuation assembly induces relative motion between the exterior shaft assembly and the jaw assembly so that contact between the cam surfaces closes the jaw assembly.

10 15. The endoscopic surgical clip applier of claim 14, wherein the jaw assembly includes a second jaw member having a third jaw arm for engaging a third portion of a ligating clip and an opposing fourth jaw arm for engaging a fourth portion of a ligating clip, the third and fourth jaw arms each comprising a cam surface.

15 16. The clip applier of claim 15, wherein:
the first jaw member comprises a substantially U-shaped body segment having a first leg and a second leg connected by a bridge member, wherein the first jaw arm extends from the first leg and the second jaw arm extends from the second leg.

20 the second jaw member comprises a substantially U-shaped body segment having a third leg and a fourth leg connected by a bridge member, wherein the third jaw arm extends from the third leg and the fourth jaw arm extends from the fourth leg.

25 17. The clip applier of claim 16, wherein:
the bridge member of the first jaw member is pivotally connected to a first side of the clip channel; and
the bridge member of the second jaw member is pivotally connected to a

second side of the clip channel, opposite the first side.

18. The clip applier of claim 14, further comprising:

a feeder bar slideably moveable along a length of the clip channel, the feeder
bar having a plurality of clip advancing elements for advancing clips toward the
distal end of the clip channel; and
an actuating assembly for actuating the feeder bar.

19. The clip applier of claim 14, wherein the actuation assembly for closing the
jaw assembly includes:

a handle assembly including a trigger; and
a yoke connected to the trigger and the outer shaft and slideably moveable
along the longitudinal axis of the shaft assembly, such that depressing the trigger
moves the exterior shaft relative to the jaw assembly.

20. The clip applier of claim 14, wherein the actuation assembly for actuating the
clip feed assembly includes:

a handle assembly including a trigger; and
a yoke connected to the trigger and the outer shaft and slideably moveable
along the longitudinal axis of the shaft assembly, such that depressing the trigger
moves the feeder bar relative to the clip channel.

21. An endoscopic surgical clip applier, comprising:

an exterior shaft assembly having a proximal end and a distal end adapted for
insertion through a cannula into a body cavity;
a clip channel disposed within the exterior shaft assembly for holding a
plurality of clips;
a jaw assembly connected to the distal end of the clip channel;

an actuation assembly including a trigger for implementing an actuation stroke having a first portion for advancing a clip from the clip channel into the jaw assembly and a second portion for closing the jaw assembly;

5 a ratchet assembly connected to the trigger, wherein the ratchet assembly precludes reverse motion of the trigger during the first portion of the actuation stroke, but allows reverse motion of the trigger during the second portion of the actuation stroke.

22. An endoscopic surgical clip applier according to claim 21, wherein:
10 the clip exterior shaft includes a collar having a plurality of cam surfaces formed at the distal end.

23. An endoscopic surgical clip applier according to claim 21, wherein:
15 the actuation assembly induces relative motion between a feeder bar and the clip channel to advance a clip from the clip channel into the jaw assembly.

24. An endoscopic surgical clip applier according to claim 21, wherein:
20 the actuation assembly induces relative motion between the exterior shaft assembly and the clip channel to close the jaw assembly.